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AUTHOR Mitchell, G.
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ABSTRACT

The research on parental deprivation done at the Wisconsin primate laboratories and related laboratories is summarized. Social isolation and certain other social conditions were observed in their effects on aggressive behavior. Isolate-reared rhesus monkeys show more abnormality in postures and movements than do socially reared monkeys from infancy through puberty. Some of these abnormalities diminish in adulthood, but in any case they interfere with effective social communication and are therefore implicated in the development of aggression. The coo vocalization, used by the rhesus when there is a stimulus change, is emitted less frequently by infant and adult isolates than by socially reared monkeys; and, in addition, the coo is not used in appropriate contexts by isolates. Isolate-reared monkeys are defective in both sending and receiving facial expressions. Isolates use the fear grimace and the stare and open-mouth threats, which appear important in aggressive behavior, more frequently after puberty than do socially reared monkeys. Isolates are also defective in looking, the most frequently used mode of communication among rhesus monkeys. Isolates apparently do not develop a clear idea of self versus not self, and as they reach adulthood they direct more and more hostility toward the self. The failure to know the self may interfere with peaceful social communication more than anything else, and apparently the monkey can come to know himself only through interaction with others. Mature social isolates are incapable of using social objects to decrease their arousal and are thus intolerably excited by social stimulation, which, in turn, accentuates their abnormalities in communication. (KM)

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# PARENTAL DEPRIVATION AND THE DEVELOPMENT OF AGGRESSION*

by

G. Mitchell

Department of Behavioral Biology

Department of Psychology

and

The University of California Primate Research Center

University of California

Davis, California 95616

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# PARENTAL DEPRIVATION AND THE DEVELOPMENT OF AGGRESSION

G. Mitchell

University of California, Davis

As one of many psychologists fortunate enough to have learned in the laboratory of the Harlows', I am particularly honored to be here to deliver a paper in Peggy's memory. The research I will discuss today originated amidst the charisma of a Harlow team long before the rhesus was a gleam in my own eyes, and this was at least 15 years ago.

What I intend to do today is present, not a history, but a condensed summary of the research on parental deprivation done at the Wisconsin primate laboratories and related laboratories beginning at about 1957. The amount and quality of research produced on this topic under the direction of the Harlows has been phenomenal, even when the work at Wisconsin is considered by itself. When one adds to this research those projects initiated and completed by Harlow students and former collaborators as well as research generated in non-related laboratories, there is an effect on psychology and allied disciplines which can be matched by no other single laboratory. This is only part of the tribute being given today to Margaret Kuenne Harlow.

The title of this presentation is, in one sense, too broad and, in another, too specific. For example, the term parental deprivation is probably too broad since only certain forms of parental deprivation can be correlated with the development of aggression. Therefore, in this paper we will be most concerned with total and partial social isolation. On the other hand, parental deprivation

is too narrow a term for the very obvious reason that other factors besides parental deprivation are implicated in the development of aggression. It is also true that parental deprivation produces more than changes in aggression.

In this paper, social isolation will be discussed since it has been reliably related to aggressiveness. In addition, certain other social conditions which produce aggressive behaviors similar to those seen following a history of social isolation will be included. The latter should serve as reminders that one must be wary of assigning the cause of aggression to any one particular type or class of behavioral experience. Finally, the changes in aggression resulting from social isolation will be reported only following an examination of changes in specific postures, vocalizations, and facial expressions. As we will see, the complex assortment of changes in these realms help to account for a large share of what we see with regard to aggression.

1. Movement and Posture

In the first month of rearing, socially reared monkeys do more climbing and jumping than do isolates, whereas isolates are more inclined to walk. In addition, the movements of isolates are slow, awkward, and rigid. These differences are maintained throughout life but diminish as the animals pass puberty. Isolates, however, remain awkward in their movements up to 12 or 13 years of age (Baysinger et al., 1972; Fittinghoff et al., in press). These differences in movement and posture convey information to human observers concerning the monkey's confidence and/or degree of relaxation. They probably also convey similar information to conspecifics.

Early in life (the first two years), isolates display more crouching and cowering than do socially reared animals. As the isolates near puberty, this crouching and cowering spontaneously decreases. By the time the monkeys are adults, there are no longer significant differences in these behaviors. Because of these changes in posture, young isolates are usually subordinate when compared to socially reared monkeys, whereas the dominance behavior of isolates past puberty is more complex (Rowland, 1964; Mitchell, 1968).

Isolate-reared rhesus at all ages show both qualitative and quantitative abnormalities in sexual posturing. This is particularly true of males, but it is also true of females (Mason, 1960).

Monkeys reared in total or partial social isolation display stereotyped movements more frequently and longer than do socially reared monkeys (Berkson, 1967; Mitchell et al., 1966). The deprivation stereotypes, such as rocking, wane with age so that by the time the isolate is two or three years of age, he usually no longer rocks. The rocking is replaced by stereotyped movements which are related to cage size such as repeated jumping, pacing, or somersaulting (Cross & Harlow, 1965; Mitchell, 1968). Mason (1968) has shown that isolates reared on moving surrogates do not display rocking and, in addition, show less arousal and/or fearfulness than do isolates not reared on moving surrogates.

A wide assortment of bizarre postures and movements appear in isolates within the first month of life (Baysinger et al., 1972) and some of these remain throughout life. The number of bizarre postures and movements displayed by an individual decreases as the

animal matures. When the isolate-reared rhesus monkey is a fully mature adult, he usually displays only two or three idiosyncratic bizarre movements (Fittinghoff et al., in press).

All of the abnormalities in postures and movements discussed above interfere with effective social communication and are therefore implicated in the development of aggression.

2. Vocalizations

The coo vocalization is a clear call which generally occurs in the rhesus monkey when there is a stimulus change. Separation of an infant rhesus from its mother or from a familiar environment produces increases in the frequency, intensity, and quality of these calls (Seay et al., 1962). These calls occur less frequently in adults than in infants and less in males than in females (Erwin & Mitchell, 1972). Facial expressions to some extent replace vocalizations of this sort as the monkey matures (Brandt et al., in press). Both infant and adult isolate-reared monkeys emit the coo less frequently than do socially reared monkeys of similar age and, in addition, the coo is not used in appropriate contexts by isolates (Mitchell et al., 1966; Mitchell, 1968; Brandt et al., in press).

The screech is associated with withdrawal and/or fear. It occurs more frequently in infant isolates than in infant controls, but this difference disappears as the animals mature (Mitchell et al., 1966; Mitchell, 1968; Fittinghoff et al., in press).

3. Facial expressions

Mason (1963) and Miller et al. (1967) have shown that isolate-reared monkeys are defective in both sending and receiving facial expressions. Three facial expressions, in particular, appear to be important in the genesis of aggressive behavior: the lipsmack, the fear grimace, and the threat.

Unfortunately, little is known concerning development of lipsmacking in isolate-reared animals. The lipsmack, the first facial expression to develop ontogenetically (Rowell, 1963), is related to affection, pacification, affiliation, or appeasement (Hinde & Rowell, 1962; Redican et al., 1971), and its value in promoting peaceful interaction between animals is substantial.

The fear grimace occurs more frequently in young (under two years) isolates than in young controls, but this difference decreases markedly at or near the onset of puberty (Mitchell et al., 1966; Mitchell, 1968).

The stare threat and open mouth threat, often accompanied by furrowed brows and head bobbing, occur less frequently in young isolates than in young controls but this difference also disappears at or before puberty and reverses following puberty (Mitchell, 1968).

The most frequently used mode of communication among rhesus monkeys, and perhaps among all terrestrial nonhuman primates, is looking. Rhesus monkeys do more looking than they do anything else (Mitchell, submitted). The duration of each look appears to be related to three basic emotional states. Long, wide-eyed expressionless looks appear early in life and are associated with affection, interest, or curiosity. They are most evident in neonates and, in adults, seem to be related to the lipsmack facial expression. Short, quick glances appear later in the first year and seem to be related to the fear grimace. In looks of intermediate duration, the areas around the eyes look tense and a minimum amount of eye movement is

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displayed. These looks are related to threats and generally develop after looks of affection and looks of fear (Rowell, 1963; Mitchell, submitted). Infant monkeys display few facial expressions, but their looking behavior is extremely important. Isolate infants display greater frequencies of quick glances than do controls. Adult isolates display a greater average duration per look than do control adults. These looks are apparently interpreted as stare threats by normal adults, but they may be more closely related to infantile wide-eyed looks (Mitchell, submitted).

Isolate infants and adults also direct significantly more behavior of all kinds toward themselves than do socially reared monkeys. These self-directed behaviors develop through the following sequence: affection related, fear related, and aggression related (Mitchell et al., 1966). This sequence is the same as for normal animals (Rowell, 1963), but the direction in which the behaviors are displayed differs. The isolates apparently do not develop a clear idea of self versus not self, and as they reach adulthood they direct more and more hostility toward the self. Gallup and McClure (1971) have shown that isolate-reared chimpanzees do not recognize themselves in mirrors as do socially reared chimpanzees. Perhaps the precursors of self-recognition are present in normal rhesus monkeys but are lacking in isolates. Since isolates are also hostile toward themselves (i.e., they bite themselves), it may be that the distinction between self-recognition and self-love is as difficult to make in monkeys as in man. The failure to know the self may interfere with peaceful social communication more than

anything else and apparently the monkey can come to know himself only through interaction with others.

In closing, it is probably important to also emphasize the state of arousal and alternatives open to the organism which displays aggression. There is no question that mature social isolates are excessively aroused (from a behavioral point of view, e.g., piloerection, activity, etc.) and especially so in those situations where they display other-directed or self-directed aggression. There is also no question that they are incapable of utilizing other social objects to decrease that arousal. An optimal level of arousal might be what they seek, but the only deviations from an optimal arousal they are able to tolerate are deviations which they themselves can produce and control. With no social alternatives open to control arousal, social stimulation produces intolerable levels of excitement which, in turn, accentuate the abnormalities in communication already discussed.

Even in feral-reared and/or normal adult males we have seen cases of extreme self-directed aggression result when the animal's arousal level was increased and there were apparently no arousal-reducing alternatives aside from behaviors directed toward his own body. During the separation of an adult feral male from a seven-month-old infant which the male had reared, the normal male bit himself so severely that, had he not received veterinary care, he would have died. Clearly, situations can be devised which make normal animals behave as do social isolates, at least in some ways. Abnormal self-directed aggression, although less likely, can and

often does appear in monkeys which have not experienced parental deprivation. Humans who have not had histories of social deprivation may also display such abnormal aggressive responses to conditions of extreme stress in which there are no other arousal-reducing alternatives.

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